

We claim:

- 1 1. An apparatus for optical determination of distance to a  
2 feature, said apparatus comprising:  
3 a) a beam generation unit for launching a reference beam  
4 on a reference path and a first beam on a first path;  
5 b) a rotation mechanism for rotating said reference path  
6 and said first path about a center along a line of  
7 said reference path and not along a line of said first  
8 path, wherein said reference beam moves over said  
9 feature at a reference time  $t_r$  and said first beam  
10 moves over said feature and at a first time  $t_1$ ;  
11 c) a determination unit for determining a distance  $r$  from  
12 said center to said feature from an angular velocity  
13  $\omega$  of said reference beam over said feature and from  
14 said times  $t_r$ ,  $t_1$ .  
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- 1 2. The apparatus of claim 1, wherein at least one of said  
2 reference path and said first path further comprise a  
3 non-collinear folded path portion.  
4
- 1 3. The apparatus of claim 1, wherein said rotation  
2 mechanism comprises at least one element selected from  
3 the group consisting of mirrors, refractive elements,  
4 diffractive elements and holographic elements.  
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- 1 4. The apparatus of claim 1, wherein said reference path  
2 and said first path are in a common plane  $\Sigma$ .  
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1        5. The apparatus of claim 1, wherein said determination  
2        unit comprises a detector for detecting said reference  
3        beam and said first beam.

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1        6. The apparatus of claim 1, wherein said beam generation  
2        unit comprises a reference source for launching said  
3        reference beam and a first source for launching said  
4        first beam.

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1        7. The apparatus of claim 6, wherein said beam  
2        generation unit comprises an active array of  
3        sources.

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1        8. The apparatus of claim 6, wherein said reference  
2        source and said first source have distinct  
3        generation modes for endowing said reference beam  
4        and said first beam with mutually distinguishing  
5        properties.

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1        9. The apparatus of claim 8, wherein said  
2        distinguishing properties are selected from  
3        the group consisting of polarization,  
4        wavelength, temporal beam format and  
5        intensity.

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1        10. The apparatus of claim 9, wherein said  
2        distinguishing properties comprise  
3        wavelength and said determination unit  
4        comprises at least one wavelength filter.

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11. The apparatus of claim 9, wherein said  
determination unit comprises a reference  
detector for detecting said reference beam  
and a first detector for detecting said  
first beam.

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12. The apparatus of claim 1, wherein said beam generation  
unit launches a second beam on a second path chosen  
such that said center is along a line of said second  
path, said rotation mechanism rotates said second path  
such that said second beam moves over said feature at  
a second time  $t_2$ , and determination unit determines  
said angular velocity  $\omega$  of said reference beam from  
said times  $t_1$ ,  $t_2$ .

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13. The apparatus of claim 12, wherein said beam  
generation unit comprises a second source for  
launching said second beam, and wherein said  
second source has a distinct generation mode for  
endowing said second beam with a distinguishing  
property selected from the group consisting of  
polarization, wavelength, temporal beam format and  
intensity.

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14. The apparatus of claim 12, wherein said reference  
path, said first path and said second path are in  
a common plane  $\Sigma$ .

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1        15. The apparatus of claim 1, further comprising an  
2        angular velocity unit for measuring said angular  
3        velocity  $\omega$  of said reference beam, said angular  
4        velocity unit being in communication with said  
5        determination unit.

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1        16. The apparatus of claim 1, wherein said feature is  
2        selected from the group consisting of micro-structure  
3        and macro-structure.

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1        17. An apparatus for optical determination of distance to a  
2        feature, said apparatus comprising:

3        a) a beam generation unit for launching a reference beam  
4        on a reference path and a first beam on a first path;

5        b) a rotation mechanism for rotating said reference path  
6        and said first path about a center not along a line of  
7        said reference path and not along a line of said first  
8        path, whereby said reference beam moves over said  
9        feature at a reference time  $t_r$  and said first beam  
10       moves over said feature and at a first time  $t_1$ ;

11       c) a determination unit for determining a distance  $r$  from  
12       said center to said feature from an angular velocity  
13        $\omega$  of said reference beam over said feature and from  
14       said times  $t_r$ ,  $t_1$ .

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1        18. An apparatus for optical determination of distance to a  
2        feature, said apparatus comprising:

3        a) a radiation detection unit for detecting radiation on  
4        a reference path and on a first path;

- b) a rotation mechanism for rotating said reference path and said first path about a center along a line of said reference path and not along a line of said first path, whereby said radiation from said feature is detected on said reference path at a reference time  $t_r$  and on said first path at a first time  $t_1$ ;
- c) a determination unit for determining a distance  $r$  from said center to said feature from an angular velocity  $\omega$  of said reference path over said feature and from said times  $t_r$ ,  $t_1$ .

19. A method for optical determination of distance to a feature, said method comprising:

- a) launching a reference beam on a reference path and a first beam on a first path;
- b) rotating said reference path and said first path about a center along a line of said reference path and not along a line of said first path, whereby said reference beam moves over said feature at a reference time  $t_r$  and said first beam moves over said feature at a first time  $t_1$ ;
- c) determining a distance  $r$  from said center to said feature from an angular velocity  $\omega$  of said reference beam over said feature and from said times  $t_r$ ,  $t_1$ .

20. The method of claim 19, further comprising adding a non-collinear folded path portion to at least one of said reference path and said first path.

1        21. The method of claim 19, wherein said step of rotating  
2            is performed with at least one element selected from  
3            the group consisting of mirrors, refractive elements,  
4            diffractive elements and holographic elements.

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1        22. The method of claim 19, wherein said reference path  
2            and said first path are arranged in a common plane  $\Sigma$ .

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1        23. The method of claim 19, further comprising endowing  
2            said reference beam and said first beam with mutually  
3            distinguishing properties.

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1        24. The method of claim 23, wherein said  
2            distinguishing properties are selected from the  
3            group consisting of polarization, wavelength,  
4            temporal beam format and intensity.

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1        25. The method of claim 19, further comprising:

2            a) launching a second beam on a second path chosen  
3            such that said center is along a line of said  
4            second path;

5            b) rotating said second path together with said  
6            reference path and said first path about said  
7            center such that said second beam moves over said  
8            feature at a second time  $t_2$ ; and

9            c) determining said angular velocity  $\omega$  of said  
10           reference beam from said times  $t_1$ ,  $t_2$ .

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1           26. The method of claim 25, further comprising  
2           endowing said second beam with a distinguishing  
3           property.

1           27. The method of claim 26, wherein said  
2           distinguishing property is selected from the  
3           group consisting of polarization, wavelength,  
4           temporal beam format and intensity.

1           28. The method of claim 25, wherein said reference  
2           path, said first path and said second path are in  
3           a common plane  $\Sigma$ .

1           29. The method of claim 19, further comprising measuring  
2           said angular velocity  $\omega$  with an angular velocity  
3           unit.

1           30. The method of claim 19, wherein said feature is  
2           selected from the group consisting of micro-structure  
3           and macro-structure.

1           31. A method for optical determination of distance to a  
2           feature, said method comprising:

3           a) launching a reference beam on a reference path and a  
4           first beam on a first path;

5           b) rotating said reference path and said first path about  
6           a center not along a line of said reference path and  
7           not along a line of said first path, whereby said  
8           reference beam moves over said feature at a reference

9           time  $t_r$  and said first beam moves over said feature at  
10           a first time  $t_1$ ;  
11       c) determining a distance  $r$  from said center to said  
12           feature from an angular velocity  $\omega$  of said reference  
13           beam over said feature and from said times  $t_r$ ,  $t_1$ .  
14  
1   32. A method for optical determination of distance to a  
2       feature, said method comprising:  
3       a) providing a reference path and a first path for a  
4           radiation;  
5       b) rotating said reference path and said first path about  
6           a center along a line of said reference path and not  
7           along a line of said first path, whereby radiation  
8           from said feature is detected on said reference path  
9           at a reference time  $t_r$  and on said first path at a  
10           first time  $t_1$ ;  
11       d) determining a distance  $r$  from said center to said  
12           feature from an angular velocity  $\omega$  of said reference  
13           path over said feature and from said times  $t_r$ ,  $t_1$ .  
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